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Abstract The process rules for manufacturing semiconductor devices such as MOSFETs are modified to provide dual work-function doping following the customary gate sidewall oxidation step, greatly reducing thermal budget and boron penetration concerns. The concern of thermal budget is further significantly reduced by a device structure which allows a reduced gap aspect ratio while maintaining low sheet resistance values. A reduced gap aspect ratio also relaxes the need for highly reflowable dielectric materials and also facilitates the use of angled source-drain (S-D) and halo implants. Also provided is a novel structure and process for producing a MOSFET channel, lateral doping profile which suppresses short channel effects while providing low S-D junction capacitance and leakage, as well as immunity to hot-carrier effects. This also affords the potential for reduction in the contact stud-to-gate conductor capacitance, because borderless contacts can be formed with an oxide gate sidewall spacer. As a result, the S-D junctions can be doped independently of the gate conductor doping, more easily allowing a variety of MOSFET structures.

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